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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,846	01/25/2002	Yasuo Ibuki	217501US3	7712

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EXAMINER

JONES, JUDSON

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/054,846	Applicant(s) IBUKI ET AL.	
	Examiner Judson H. Jones	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24 and 28 is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-17, 20-23 and 25-27 is/are rejected.
- 7) ☒ Claim(s) 12-14, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's arguments filed 9 January 2004 have been fully considered but they are not persuasive. The sentence "In other words, the repelling coil should be activated just before the armature hits the repelling coil 180, but clearly not before the dead center of the armature." makes no sense. A reciprocating element has two dead centers, one top and one bottom. The dead centers are the furthest extremes of the element's travel. In Funderburg the point just before the armature hits the repelling coil is the dead center of the armature.

This is the same interpretation of the phrase "dead center" as used in Applicant's specification. From page 3, paragraph 0009 "According to another aspect of the present invention, a linear oscillation motor includes a rotor, a stator, one of the rotor and the stator comprising an electromagnet with a winding, a sensor configured to detect movement of the movable element, a controller configured to intermittently supply electric power to the winding of the electromagnet to rotate the rotor periodically changing a rotational direction of the rotor, the controller being configured to begin each intermittent supply of electric power to the winding *at a timing before a dead center at which the rotor changes its rotational direction*, and an oscillatory element configured to be moved reciprocally and linearly by rotation of the rotor." (Emphasis added in Italic.).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2834

Claims 1, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Funderburg 4,228,373 A (of record). Funderburg discloses a movable element 14 and a stator 12, 14, 16, both shown in figure 1, a sensor as described in column 4 lines 40-47, and a controller configured to begin each intermittent supply of electric power to a winding at a timing before a dead center of the movable element as described in column 6 lines 13-19.

In regard to claim 8, see Funderburg column 6 lines 35-40.

In regard to claim 9, see Funderburg column 4 line 34 where the phrase "reciprocal motion" is used. The sensed motion is either velocity or acceleration.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5, 7-11, 16, 17, 20, 21, 23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amaya et al. 5,955,799 A (of record) in view of Funderburg and Keller 3,584,496 A (of record). Amaya et al. discloses a controlling apparatus for controlling a linear oscillating motor having a movable element 2, a stator 3, a sensor 39 and a controller 5 but does not disclose supplying power to the winding before a dead center of the movable element. In column 6 lines 48-52 Amaya et al. states, "The control circuit 5 only permits the driving current to flow in a direction determined in accordance with the detected direction in which the reciprocator assembly 2 moves, in order to thereby prevent the driving current from braking the reciprocator assembly 2." Funderburg teaches in column 6 lines 13-19 providing power to a winding before the moving member changes direction but provides no reasons for this timing. Keller teaches in column 12 lines 18-21 that current applied to a winding does not immediately

Art Unit: 2834

form a magnetic field. Since Funderburg, Keller and Amaya et al. are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have advanced the timing of the Amaya et al. device in order to correct for the delay in the formation of a magnetic field due to coil inductance. While this would brake the reciprocator assembly somewhat, there would be a trade off between a slight braking effect while the reciprocator assembly was finishing its up stroke versus a much increased driving effect when the reciprocator assembly began its down stroke.

In regard to claim 2, see Amaya et al. column 5 lines 37-41.

In regard to claim 3, see Amaya et al. column 5 line 24 to column 6 line 18 and column 6 lines 48-52. Amaya teaches here that two reference points can be detected. First is the point of maximum velocity and second is the top dead center point. If one were to advance the timing of control pulse to slightly before top dead center, then it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the point of maximum velocity as the reference timing point.

In regard to claims 4 and 5, see Amaya et al. column 6 line 48 to column 7 line 14.

In regard to claim 7, see Amaya et al. column 5 lines 19-23.

In regard to claim 8, see Amaya et al. column 7 lines 60-67.

In regard to claim 9, see Amaya et al. column 6 lines 7-11.

In regard to claim 10, see Amaya et al. column 6 lines 6-18 and column 6 lines 52-58.

In regard to claim 11, see Amaya et al. column 5 lines 50-64.

In regard to claims 16 and 17, see Amaya et al. column 6 lines 19-29, which discloses the amplitude detection means. In the device of Amaya et al. as modified by Funderburg and Keller,

Art Unit: 2834

the controller is always is configured to supply power at a timing before the top dead center of the movable element. This type of operation meets Applicant's claim language of supplying power to the movable element at a time before the top dead center during a part of the operation of the oscillating device.

In regard to claim 20, see Amaya et al. column 6 lines 19-29.

In regard to claim 21, see Amaya et al. column 6 lines 19-29 and column 8 lines 55-67.

Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amaya et al. as modified by Funderburg and Keller as applied to claims 5 and 11 above, and further in view of Dvorkis et al. 6,348,773 B1 (of record). Amaya et al. as modified by Funderburg and Keller discloses the control apparatus but does not disclose the sensor comprising the drive winding. Dvorkis et al. teaches making the drive winding also serve as the sense means in column 14 lines 61-67. Since Dvorkis et al. and Amaya et al. as modified by Funderburg and Keller are from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized the drive winding to also serve as the sense means in order to simplify the motor by reducing the number of parts and thus to reduce the cost of the motor.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Amaya et al. as modified by Funderburg and Keller as applied to claim 19 above, and further in view of Barkan 5,280,163 A (of record). Amaya et al. as modified by Funderburg and Keller discloses the controlling apparatus but does not disclose providing the movable element with force in only one direction. Barkan teaches in column 9 lines 20-31 for the purpose of driving the motor at its natural resonant frequency. Since Barkan and Amaya as modified by Funderburg and Keller are

Art Unit: 2834

from the same field of endeavor it would have been obvious at the time the invention was made for one of ordinary skill in the art to have utilized a control means for driving the movable element in only one direction in order to make the motor more efficient as taught by Barkan in column 9 lines 32-35.

Allowable Subject Matter

Claims 24 and 28 are allowed.

Claims 12-14, 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose or teach a controlling apparatus where an induced voltage calculator is configured to calculate the induced voltage based on current and the voltage of the inducing device as recited in claims 12 and 13. The prior art of record does not disclose or teach an induced voltage calculator combined with a voltage normalizing device to normalize the calculated induced voltage further combined with a reference timing generator to generate a reference at which the normalized voltage is equal to a predetermined voltage as recited in claim 14. The prior art of record does not disclose or teach selecting a strong driving condition and then supplying power to a winding before the top dead center of the movable element as recited in claim 18. The prior art of record does not disclose or teach does not disclose first and second predetermined amplitudes where the second predetermined amplitude is less than the first predetermined amplitude and the controller is configured to supply maximum power to the winding when the amplitude of oscillation of the movable member is less than the second

Art Unit: 2834

predetermined amplitude as recited in claim 19. The prior art of record does not disclose or teach a linear oscillation motor having an oscillation element configured to be moved reciprocally and linearly by rotation of a rotor combined with a sensor for detecting movement of the movable element and a controller configured to supply power to the winding before a dead center at which the rotor changes rotational direction as recited in claim 24.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

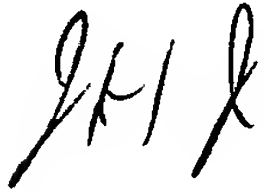
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judson H. Jones whose telephone number is 571-272-2025. The examiner can normally be reached on 8-4:30 M-F.

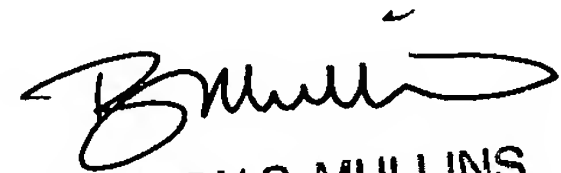
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Burt Mullins can be reached on 571-272-2029. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2834

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



JHJ 2/13/2004



BURTON S. MULLINS
PRIMARY EXAMINER